IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the Application:

LISTING OF CLAIMS:

1. (Currently Amended) A cache, comprising:

a front-end interface that receives data access requests that specify respective data storage addresses;

a back-end interface that can retrieve data identified by the data storage addresses;

cache storage formed by at least two disks; and

a cache manager that services at least some of the requests received at the front-end interface using data stored in the cache storage;

the cache manager being configured to receive a write request to store data and, in response to the write request, split that data into data portions and separately store the data portions on respective disks of the cache storage; and

the cache manager being further configured to receive a read request to read the data and, in response to the read request, concurrently read the data portions which are separately stored on the respective disks of the cache storage to retrieve the data

~~where said cache manager stores, in response to detecting a power failure, identifications data identifying addresses within said cache storage where data is stored and the corresponding addresses at a back-end storage area where the data is stored~~.

2. (Original) The cache of claim 1, wherein the front-end interface comprises an interface confirming to a protocol.

3. (Previously Presented) The cache of claim 2, wherein the protocol comprises at least one of the following: SCSI (Small Computer System Interface), Fibre Channel, INFINIBAND, and IDE (Integrated Device Electronics).

4. (Original) The cache of claim 1, wherein the disks comprise disks having platters less than 3.5 inches in diameter.

5. (Original) The cache of claim 4, wherein the disks comprise disks having at least one of the following platter sizes: 2.5 inches, 1.8 inches, and 1 inch in diameter.

6. (Original) The cache of claim 1, wherein the cache implements a RAID (Redundant Array of Independent Disks) scheme using the disks.

7. (Original) The cache of claim 1, wherein the cache performs at least one of the following operations: requesting data from a back-end storage system, retrieving requested data from the disks, sending data to the back-end system for writing, determining the location of back-end system data within the disks, and removing data from the disks.

8. (Original) The cache of claim 1, wherein the addresses specify storage locations of a back-end storage system that includes a collection of one or more disks.

9. (Original) The cache of claim 1, wherein the requests comprise I/O (Input/Output) requests.

10. (Original) The cache of claim 1, wherein the data storage addresses comprise data storage addresses within an address space.

11. (Original) The cache of claim 10, wherein the address space comprises an address space of back-end storage.

12. (Original) The cache of claim 10, wherein the address space comprises an address space of a different cache.

13. (Original) The cache of claim 1, wherein the cache storage comprises cache storage having more than one disk spindle.

14. (Currently Amended) A method of servicing data access requests at a cache, the method comprising:

receiving the data access requests at the cache, the cache having cache storage formed by at least two disks, the requests specifying respective data storage addresses; and

servicing at least some of the requests using data stored in the disks;

where receiving the data access requests includes receiving a write request to store data, where servicing at least some of the requests includes splitting that data into data portions and separately storing the data portions on respective disks of the cache storage in response to the write request; and

where receiving the data access requests further includes receiving a read request to read the data, and where servicing at least some of the requests further includes concurrently reading the data portions which are separately stored on the respective disks of the cache storage to retrieve the data in response to the read request

~~where servicing further comprises storing, in response to detecting a power failure, identification data identifying addresses of data stored within said cache storage and the corresponding addresses at a back-end storage area where the data is stored~~.

15. (Original) The method of claim 14, wherein the requests comprise requests conforming to a protocol.

16. (Previously Presented) The method of claim 15, wherein the protocol comprises at least one of the following: SCSI, Fibre Channel, INFINIBAND, and IDE.

17. (Original) The method of claim 14, wherein the requests comprise at least one read request.

18. (Original) The method of claim 14, wherein servicing the requests comprises retrieving data from the back-end storage and storing the data in at least one of the disks.

19. (Original) The method of claim 18, wherein storing the data comprises storing the data in accordance with a RAID scheme.

20. (Original) The method of claim 14, wherein servicing the requests comprises determining whether the collection of disks currently stores the requested data.

21. (Original) The method of claim 14, wherein the data storage addresses comprise data storage addresses within an address space.

22. (Original) The method of claim 21, wherein the address space comprises an address space of a back-end system formed by a collection of disks.

23. (Currently Amended) A data storage system, comprising:

a back-end storage system having an address space, addresses in the address space identifying blocks of storage; and

a cache for the back-end storage system having a lesser storage capacity than the back-end storage system, the cache including:

a front-end interface that receives I/O (Input/Output) requests that specify respective addresses of back-end storage blocks;

a back-end interface that communicates with the back-end storage system;

cache storage formed by at least two disks having platter diameters less than 3.5 inches;

and

a cache manager that services at least some of the I/O requests received via the front-end interface using blocks temporarily stored in the cache storage;

the cache manager being configured to receive a write request to store data and, in response to the write request, split that data into data portions and separately store the data portions on respective disks of the cache storage; and

the cache manager being further configured to receive a read request to read the data and, in response to the read request, concurrently read the data portions which are separately stored on the respective disks of the cache storage to retrieve the data

~~where said cache manager further stores, in response to detecting a power failure, identification data identifying addresses of data stored within said cache storage and the corresponding addresses at said back-end storage area where the data is stored~~.

Claim 24. (Canceled)

25. (Previously Presented) The cache of claim 1, wherein said cache further comprises at least one interface conforming to a protocol to allow at least one additional disk to be connected to said cache storage.

Claims 26-29. (Canceled)

30. (Previously Presented) The data storage system of claim 23, wherein said cache further comprises at least one interface conforming to a protocol to allow at least one additional disk to be connected to said cache storage.

Claim 31. (Canceled)

32. (Currently Amended) A data storage system, comprising:

a back-end storage system having a back-end address space, addresses in the address space identifying blocks of storage; and

a plurality of caches for the back-end storage system, each of said plurality of caches having a lesser storage capacity than the back-end storage system, each of said plurality of caches including:

a front-end interface that receives I/O (Input/Output) requests that specify respective addresses of back-end storage blocks;

a back-end interface capable of communicating with one of back-end storage system and another of one of said plurality of caches;

cache storage formed by at least two disks, said cache storage having a respective cache storage address space; and

a cache manager that services at least some of the I/O requests received via the front-end interface using blocks temporarily stored in the data storage system, said at least some of the I/O requests corresponding to addresses in said respective cache storage address space of at least some of said plurality of caches.

Claim 33. (Canceled)

34. (Previously Presented) The data storage system of claim 32, wherein:

said plurality of caches are connected in series such that the front-end interface of one of said of plurality of caches is couples to the back-end interface of another of said plurality of caches;

the front end interface of one of said plurality of caches is coupled to a device making said I/O requests; and,

the back-end interface of one of said plurality of caches is coupled to said back-end storage system.

35. (Previously Presented) The data storage system of claim 34, wherein upon receiving one of I/O requests at said front-end interface of one of said plurality of caches, the cache manager of said one of plurality of caches sends data corresponding to said one of I/O requests to said device making said one of I/O requests if said data is stored on the cache storage of said one of plurality of caches.

36. (Previously Presented) The data storage system of claim 34, wherein upon receiving one of I/O requests at said front-end interface of one of said plurality of caches, the cache manager of said one of plurality of caches sends said one of I/O requests to one of back-end storage and another of said plurality of caches couples to the back-end-interface of said one plurality of caches if said data is not stored on the cache storage of said one of plurality of caches.

37. (Previously Presented) The data storage system of claim 32, wherein each of said plurality of caches further comprises at least one interface conforming to a protocol to allow at least one additional disk to be connected to said cache storage.

Claim 38. (Canceled)

39. (Previously Presented) The cache of claim 1, where said identification data corresponds to cache locations of deferred writes.

40. (Previously Presented) The method of claim 14, where said identification data corresponds to cache locations of deferred writes.

41. (Previously Presented) The data storage system of claim 23, where said identification data corresponds to cache locations of deferred writes.

42. (Previously Presented) The data storage system of claim 38, where said identification data corresponds to cache location of differed writes.

43. (New) The cache of claim 1 wherein the cache storage is configured to provide, as an initial caching capacity of the cache storage, a first cache storage size; and wherein the cache storage is configured to provide, as a subsequent caching capacity of the cache storage, a second cache storage size in response to addition of a new disk to the cache storage, the second cache storage size being larger than the first cache storage size.

44. (New) The cache of claim 43 wherein the cache manager, when responding to the read request, is configured to:

(i) receive the read request from another cache device connected to the cache in series as part of a cache hierarchy in response to a cache miss at the other cache device, the cache miss involving a failure of the other cache device to provide cached data corresponding to an address of the cache storage;

(ii) obtaining the data portions which are separately stored on the respective disks from the cache storage in response to the read request; and

(iii) providing the obtained data portions to the other cache device to satisfy the read request.

45. (New) The method of claim 14 wherein the cache storage is configured to provide, as an initial caching capacity of the cache storage, a first cache storage size, and wherein the method further comprises:

adding a new disk to the cache storage to provide, as an subsequent caching capacity of the cache storage, a second cache storage size, the second cache storage size being larger than the first cache storage size.

46. (New) The method of claim 45 wherein receiving the read request includes acquiring the read request from another cache device connected to the cache in series as part of a cache hierarchy in response to a cache miss at the other cache device, the cache miss involving a failure of the other cache device to provide cached data corresponding to an address of the cache storage; and

wherein concurrently reading the data portions includes obtaining the data portions which are separately stored on the respective disks from the cache storage in response to the read request, and providing the obtained data portions to the other cache device to satisfy the read request.

47. (New) The data storage system of claim 23 wherein the cache storage is configured to provide, as an initial caching capacity of the cache storage, a first cache storage size; and wherein the cache storage is configured to provide, as a subsequent caching capacity of the cache storage, a second cache storage size in response to addition of a new disk to the cache storage, the second cache storage size being larger than the first cache storage size.

48. (New) The data storage system of claim 47 wherein the cache manager, when responding to the read request, is configured to:

(i) receive the read request from another cache device connected to the cache in series as part of a cache hierarchy in response to a cache miss at the other cache device, the cache miss involving a failure of the other

cache device to provide cached data corresponding to an address of the cache storage;

(ii) obtaining the data portions which are separately stored on the respective disks from the cache storage in response to the read request; and

(iii) providing the obtained data portions to the other cache device to satisfy the read request.

49. (New) The data storage system of claim 32 wherein the cache manager is configured to receive a write request to store data and, in response to the write request, split that data into data portions and separately store the data portions on respective disks of the cache storage; and wherein the cache manager is further configured to receive a read request to read the data and, in response to the read request, concurrently read the data portions which are separately stored on the respective disks of the cache storage to retrieve the data.

50. (New) The data storage system of claim 49 wherein the cache storage is configured to provide, as an initial caching capacity of the cache storage, a first cache storage size; and wherein the cache storage is configured to provide, as a subsequent caching capacity of the cache storage, a second cache storage size in response to addition of a new disk to the cache storage, the second cache storage size being larger than the first cache storage size.